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NATIONAL RESOURCES COMMITTEE

WATER PLANNING

FEBRUARY 1938

The National Resources Committee, a Federal agency planning for the better conservation and use of our national resources, succeeded to the functions and duties of the National Planning Board and the National Resources Board. The National Resources Board was established by President Roosevelt on June 30, 1934, "to prepare and present to the President a program and plan of procedure dealing with the physical, social, governmental, and economic aspects of public policies for the development and use of land, water, and other national resources and such related subjects as may from time to time be referred to the Board by the President."

Throughout the course of its activities this planning agency has issued a number of reports on national resources. These reports, in general, are technical and extensive. To give a summarized view of what the reports have covered in the various fields of physical and human resources, digests of the Committee's reports have been prepared for presentation in pamphlet form.

A conscientious effort has been made to interpret each report within the limits of a brief pamphlet; the Committee, however, is not responsible for interpretative comment made necessary by condensation.

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WATER PLANNING AND POLICY FOR DRAINAGE BASINS OF THE U. S.

PLANNING for the wise use and development of our water resources requires the cooperation of engineers, other specialists and lay citizens.

Those who know most about the possibilities and methods of using and controlling water must appraise and fit together projects for flood control, navigation, soil conservation, irrigation, water supply, pollution abatement, power development, and other particular water uses, so that an integrated plan for a whole drainage basin can be developed. Many purposes can be served together—protagonists for one use are coming to see their projects as part of a large whole. The Water Committee of the National Resources Committee, including representatives of the War, Interior, and Agriculture Departments, Public Health Service, Federal Power Commission, and Tennessee Valley Authority, has provided a clearing house for plans and projects. Through its work a coordinated plan for each drainage basin in the country has been brought more nearly into focus, and these individual plans have been reviewed and correlated in terms of national needs and budgetary limitations.

Through the democratic process, with participation in planning for the future of the areas in which they live, our citizens have found opportunity to make known their needs and to see how their requirements may fit together in a general plan. Forty-five Drainage Basin Committees, organized through the regional offices of the National Resources Committee, with both State and Federal representation, have demonstrated the usefulness of citizen groups for planning work, in the development of planning policies and programs presented in Drainage Basin Problems and Programs—1937 Revision. Progressive revision of programs of work and general plans for

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development is necessary as new problems arise, new standards are recognized, and new methods are found to meet them.

Development of Water Plans

Beginning with the President's Committee on Water Flow, appointed in the winter of 1934 and consisting of the Secretaries of Interior, War, Agriculture, and Labor, the work has gone through several stages with different emphasis or purpose. The first report,[1] prepared by eight subcommittees for as many regions and brought together through the offices of the National Planning Board, was a kind of compendium of water projects drawn from the "308" Reports of the Army Engineers and the experience of the Bureau of Reclamation. Although the report dealt primarily with navigation, flood control, irrigation and hydroelectric power, it opened the door to consideration of all the other multiple-use aspects of water planning and emphasized the regional water problems of the country.

Concurrently, the Mississippi Valley Committee of the Public Works Administration was at work on water problems of the two-thirds of the country drained by the "Father of Waters." The Report[2] of the Committee brought new recognition of the broad problems of social and economic policy inherent in water planning. Through the dramatic and colorful manner in which the material was presented, the administration and the public were interested in multiple-purpose projects for water use.

In June 1934, the National Resources Board was appointed by the President with instructions to prepare a report[3] on water resources in time for con-

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[1] Report of the President's Committee on Water Flow—transmitted to Congress with Presidential Message on June 4, 1934, and printed as Document 395, 2d sess., 73d Cong.
(A list of water planning publications, with a brief description and a price listing for each, is included at the end of this digest.)

[2] Report of the Mississippi Valley Committee, transmitted to Congress January 24, 1935.

[3] Report of the National Resources Board transmitted to Congress, January 24, 1935.

sideration at the next session of Congress. The Mississippi Valley Committee became the Water Planning Committee of the new Board and its report went forward to the President on December 1, 1934, with other reports of the National Resources Board. It emphasized an inventory of water resources and brought together data on rainfall, run-off, stream flow-underground waters, etc. A series of eight monographs, each covering a region or group of drainage basins, was prepared and issued as supporting data. Following the submission of these reports, the Water Planning Committee attempted a first priority rating of construction projects concerning water use and conservation.

Work of Water Resources Committee

The National Resources Committee, upon its organization in June 1935, reconstituted the Water Resources Committee [4] to provide membership within the group for some of the leaders in water planning from within the Government. The major effort of the Committee has been the Drainage Basin Report, of 1936 and 1937, discussing the principal problems of each area and recommending lists of projects for investigation or construction in order of priority. The Report of 1936 is important not only for its content but also because of the manner of its preparation. The cooperative work of the State Planning Boards and Federal Bureaus made the report possible. The employment of eminent engineers as Regional Water Consultants gave assurance of high technical quality of the work. The report submitted in December 1936 underwent revision by the same method to bring it up to date with accomplishments or new information gained during 1937.

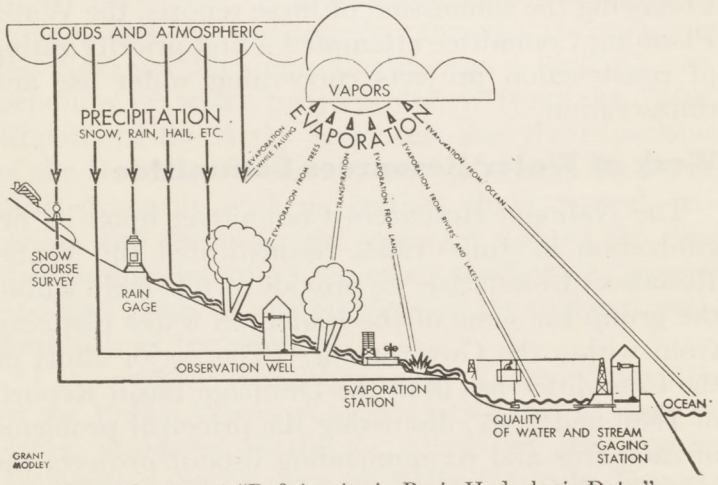
This Nation-wide study of water problems has been supplemented by special studies in the Upper Rio

[4] Now composed of Abel Wolman, chairman; Bushrod W. Allin, H. H. Barrows, N. C. Grover, E. Hyatt, Milton S. Eisenhower, R. B. McWhorter, J. C. Page, Thorndike Saville, Maj. Gen. Julian L. Schley, R. E. Tarbett, and S. M. Woodward, with Gilbert White as secretary.

Grande, Red River of the North, Delaware River, and other basins. During the year, also, the Committee has been called upon to review, among other special projects, proposals for the Ohio-Lower Mississippi Flood Program through the subcommittee on the Ohio-Lower Mississippi River Regulation Program.

The Water Resources Committee has also followed up other aspects of the water planning problem.

HOW THE WATER CYCLE IS MEASURED



From the report "Deficiencies in Basic Hydrologic Data."

Special attention has been given to problems of water bookkeeping and a report [5] (humorously but accurately described as "H_2 Omissions") was issued in an effort to make clear the costs of ignorance of fundamental data. In it a technical subcommittee shows the additional information needed and outlines both standards for getting it and cooperative methods which might be used by State and Federal Governments to secure continuity in the records. The subcommittee is now at work on an outline for research projects to supplement our knowledge of water behavior.

Another subcommittee of the Water Resources Committee has continued work on the vexing pollu-

[5] Deficiencies in Basic Hydrologic Data, published September 1936, by the National Resources Committee.

tion problem and here again a report [6] has been brought together showing both the great advance of the last few years (largely through the assistance of the Public Works Administration) and the possibilities of further progress under a policy of Federal stimulation and cooperation with State and local governments.

The Water Committee and its small staff carry on a clearing-house service for water-storage and land-drainage projects, for P. W. A. water projects, flood control projects, and investigations. Through special committees, work is under way on a joint Federal Manual covering design of small dams, and on an inventory of unpublished hydrologic data.

It is difficult to appraise the accomplishments due to this water-planning activity of the National Resources Committee because the administration of water projects lies with other agencies. Much credit properly belongs with those agencies. It can be said with assurance, however, that the reports which started with the President's Committee on Water Flow and the methods adopted by the Resources Committee for participation by State and Federal agencies in the formulation of those reports have greatly advanced:

1. General public understanding and interest in the importance of wise use and development of water resources;

2. Public acceptance of the multiple-purpose development of water resources and Congressional recognition of these principles;

3. Orderly preparation of programs of water construction projects, coordinating all uses and putting proposals in order of priority of need and use; and, most important of all,

4. Cooperative spirit among the many Federal and State agencies concerned with Water Planning.

[6] Reprint from Hearings by Rivers and Harbors Committee on H. R. 2711, H. R. 2300, and H. R. 3419, May 1937.

"DRAINAGE BASIN PROBLEMS AND PROGRAMS—1937 REVISION"

Events of 1937 have emphasized the magnitude and urgency of various long-standing water problems. Thus, the deluge in the Ohio Valley ravaged communities that had suffered from high floods for nearly a century and a half. It focused attention anew upon the old fact, commonly ignored, that the tendency of men to occupy and utilize the floors of great valleys cannot with impunity run counter to the uncontrolled habits of mighty rivers. It afforded a tragic illustration not only of the folly of ignoring the laws of nature, but also of the mounting hazards to man inherent in myriad maladjustments of his ways to the ways of nature. Similarly, droughts of recent years give rise to equally serious problems of land use and water conservation.

The year 1937 also emphasized the fact that passing time brings wholly new water problems, some of which quickly may assume large proportions. An example is furnished by the increasing draft on ground water caused by the amazing development of air-conditioning, by which public water supplies obtained from wells are being seriously overtaxed and damaged in many places.

Year by year, water hazards and water requirements change in most areas, rapidly or slowly, with changes in population, land use, industry, technical equipment, social conditions, and natural processes. Year by year, accordingly, there will be occasion to adjust water programs to shifting needs that must be met, so far as possible, by a flexible national water plan if the public welfare is to be safeguarded and promoted.

Progress in 1937

Progress during 1937 in the development of water plans is recorded in a report requested by the Presi-

dent and prepared by the Water Resources Committee, revising the report on Drainage Basin Problems and Programs submitted to Congress on February 3, 1937. This report is the latest in a series of major efforts to clarify the problems of water conservation and development.

A growing interest in water problems is indicated by the progress made during the years 1936–37 (1) in constructing works for the control and use of water, (2) in planning for the more effective control and more efficient use of water, (3) in shaping public policies to deal with water resources for the greater good of the greater number, and (4) in the assembly of basic factual data needed for sound planning and for safe and economical construction.

In Construction

Appropriations and allotments by the Federal Government for operations in the field of water resources were higher in 1936 and again in 1937 than in any earlier year. Apart from the enlargement and deepening of various harbors, work in behalf of navigation related chiefly to further improvement of several of the larger members of the Mississippi System. Forty-five flood-control projects, widely scattered throughout the country, were approved by the President in 1937. Various other projects were under construction or completed in both years. Substantial progress was made on irrigation works—on one or more of them in each of the 11 arid States. Federal expenditures for water-power development related also to one or more associated benefits in each instance, and included several of the larger projects yet undertaken. Federal aid in one form or another also was given to water supply enterprises, pollution abatement undertakings, and drainage for mosquito control.

In Planning

The record of the last two years shows that water planning is not only progressing in the field of local needs, but is moving out into the broader domain of the requirements of drainage basins or regions. The record reveals also an unprecedented emphasis upon multiple-use projects, a sign of the trend toward integrated planning. Still further, the record discloses more effective and more general cooperation in planning than ever before among and within Federal, in-

TABULAR INDEX OF FEDERAL AGENCIES

Agency	Basic hydrologic data					
	Precipitation	Evaporation	Stream flow and coastal waters	Ground water	Quality of water (including silt)	Dam-site and river survey
Department of Agriculture:						
Bureau of Agricultural Engineering	S	DS	DS	DS	DS	
Bureau of Biological Survey			S			S
Bureau of Entomology and Plant Quarantine						
Bureau of Plant Industry	DS	DS			DS	
Forest Service	D	D	DS			
Soil Conservation Service	DS	DS	DS	DS	DS	DS
Weather Bureau	DS	DS	DS			
Department of Commerce:						
Bureau of the Census						
Bureau of Fisheries					DS	
National Hydraulic Laboratory			S			
U. S. Coast and Geodetic Survey			DS			
Department of the Interior:						
Bureau of Mines				DS	DS	
Bureau of Reclamation	DS	DS	DS	DS	DS	DS
Division of Grazing						
General Land office						
National Park Service						
Office of Indian Affairs			S	D		DS
U. S. Geological Survey—Water Resources Branch	S	S	DS	DS	DS	
U. S. Geological Survey—Conservation Branch			DS			DS
State Department:						
International Boundary Commission—United States and Mexico	DS	DS	DS		DS	DS
International Joint Commission						
Treasury Department: Public Health Service					DS	
War Department: Corps of Engineers	DS	DS	DS	S	DS	DS
Independent Agencies:						
Emergency Conservation Work						
Farm Credit Administration						
Federal Power Commission						
National Resources Committee	S	S	S	S	S	S
Panama Canal	DS	DS	DS		DS	DS
Public Works Administration						
Reconstruction Finance Corporation						
Tennessee Valley Authority	DS	DS	DS		DS	DS
Works Progress Administration						

D=Collects data. C=Supervises construction.

terstate, State, and local agencies. It augurs well for the future that cooperative, integrated regional planning is coming into dominance. Not by other means could the complex and manifold water problems that face the country in utter disregard of State boundaries be solved successfully.

In Shaping Public Policies

Progress during 1935–37 in the formulation of public water policies adjusted to the increasing de-

CONCERNED WITH WATER USE AND CONTROL

Problems of water use and control								
Flood protection	Hydroelectric power	Irrigation	Land drainage	Navigation	Waste disposal and pollution	Water supply—Urban	Water supply—Rural	Wildlife conservation
		DS	DS				DS	
								DSC
			SC					
		DS						
DSC	DSR						DSC	DSC
DSC							DSC	
D								
		D	D					
					DS			DSC
					DS			
	DSC	DSC	DSC					
							DSC	
		DSR				DSR	DSR	
	DSC				DSC	DSC		DSC
		DSC			SC		DSC	
D	D	D				DS	DS	
	DSR	R						
DSCR	DSR	DSCR			SCR	SCR		
SR	SR	SR		SR	SR	SR		
			S		S	SR		
DSC	DSC	DSC		DSCR	S	S		
C		C	C			C	C	C
		DS	DS					
	DSR							
S	S	S	S	S	S	S	S	S
	DSC		DSC	DSC	DSC	DSC		
C	C	C	C	C	C	C	C	C
C	C	SC	SC	C	C	C		
DSC	DSC			DSC	DS			DSC
C	C	C	C	C	C	C	C	C

S=Carries on studies and research. R=Regulates non-federal activity.

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mands for water in modern life and to the menace of uncontrolled waters is reflected in Federal and State legislation. It is true that most of the legislation enacted dealt with particular types of water problems, not with comprehensive water codes. Nevertheless, corollary problems were treated in many instances and principles of action were adopted that mark an advance. It is particularly noteworthy that 8 States passed laws for the control and utilization of water on a State-wide basis and that most of these laws authorized cooperation with other States and with the Federal Government in water studies and planning. More than three-fourths of the States passed one or more laws affecting in one way or another the control and use of water. Flood control, navigation, pollution abatement, hydroelectric power, irrigation, water supply, drainage, soil erosion, and multiple use of water—all were subjects of State legislation. Federal legislation also covered a wide range of subjects in the field of water resources.

In Assembling Basic Data

Comprehensive and accurate hydrologic information is indispensable to adequate treatment of the larger problems of water. It is therefore most unfortunate that basic data are lacking to greater or less degree on both the surface and underground waters of almost every drainage basin in the country. Moreover, a large amount of data is unpublished and therefore not available for general use. The general removal of these deficiencies will require many years even if adequate action to that end is initiated promptly, since long-term records are essential for many purposes. Meanwhile, the penalty of ignorance that might have been avoided amounts to millions of dollars annually. The nature of the deficiencies has been set forth in detail, and a program for their removal has been formulated.[7] Dur-

[7] Deficiencies of Basic Hydrologic Data and Drainage Basin Problems and Programs, December 1936; also 1937 Revision.

ing 1936–37, hydrologic research has been stimulated and expanded, but unhappily little progress has been made in the actual removal of deficiencies. Nor can adequate progress be made without the requisite authorizations and appropriations by the Congress and by State legislatures.

The deplorable situation that now exists may be illustrated in terms of deficiencies in data relating to ground water. Water underground is the chief source of supply throughout large areas. Because the amount is limited and because the economic life of these areas is largely dependent on an adequate and permanent supply, full information regarding it is needed so that urban, industrial, and agricultural development may rest on sound foundations. Although areal studies of ground water have been made in many sections, vast areas have not been investigated. A comprehensive Federal program for the collection of basic ground-water data, including adequate records of fluctuations of the water table, in all parts of the country, is sorely needed. Such a program would relate fundamentally to the evaluation, proper use, and conservation of all ground-water supplies. Unless it is undertaken before the effects of the recent droughts have been dispelled, this opportunity to gather much valuable data regarding one of the more important resources of the country will be forever lost.

WATER POLICY

Characteristics

As stated by the Water Committee, a "unified plan of water control and development, in contrast to a medley of unrelated projects, calls for an integrated Federal policy with respect to the various types of water problems in their interlocking relationships in contrast to a collection of more or less unrelated policies. * * *" A sound Federal policy will have the following characteristices:

1. It will be concerned, not with water by and for itself, but with the promotion of public safety, public health, the public convenience and comfort, the economic welfare of the public, the establishment or maintenance of a high standard of living.

> "No public expenditures to control the behavior of water would be justified save to promote human welfare. Water problems merge into land problems and both water problems and land problems merge into human problems. All sound water planning will be concerned fundamentally with people who live on the land and depend on the water, menaced at times, perhaps, by its abundance or its scarcity. The basic problem with respect to floods, for example, is not to control flood waters but to protect life and property from destruction or damage by floods, through whatever means or combination of means may present the optimum of effectiveness and economy. It is erroneous to suppose that physical resources planning may be separated properly from economic and social planning. The two phases, physical and cultural, should not be divorced."—Water Resources Committee.

2. It will seek to promote the maximum integrated control and use of water, within the changing limits of technical feasibility and of economic and social justification.

> "Not to promote the integrated development and utilization of latent water resources as promptly and fully as all relevant technical, economic, and social conditions warrant is to invite waste of potential wealth and so is incompatible with the public interest.
>
> "Integrated control and use of water implies planning and constructing projects for dual or multiple benefits wherever practicable. Actually, almost every water project of magnitude may be made to contribute to the solution of more than one problem. Not to realize all of

its feasible potentialities is inimical to the public interest. A large dam and storage reservoir built and used solely for flood control is a wasteful maladjustment, socially if not economically, provided it would have been practicable to design, construct, and operate them to regulate the flow of the stream for other purposes as well as flood control, to develop marketable power, or to realize incidental reservoir values in connection with recreation and wild life conservation. Coming years, like the last few years, should witness increasing emphasis on multiple-purpose projects. The regulation and integrated development of rivers for all useful purposes is an attainable goal."—Water Resources Committee.

3. It normally will treat drainage areas as units.

"Drainage basins normally should be treated as units in planning and carrying out the control and development of their river systems, for the cogent reason that a chain of connected problems extends from the source of each tributary to the mouth of the main river. Since the problems along the course of a river are systematically interrelated, the measures adopted for their solution should form an integrated program in which the mutual relations of the various elements are established in proper balance. Too often, to cite an example of ill-advised practice, a flood problem has been treated solely in terms of a particular locality, urban or rural, with resultant injury that might have been avoided, to other localities farther down stream. Too often in many connections, a proper concern with problems of detail has led to an improper neglect of their broad interrelationships. The range and complexity of the water problems found in most large drainage basins along the courses of their numerous connecting streams largely explain such shortcomings, but they cannot longer excuse them."—Water Resources Committee.

4. It will observe the rights of States both in intrastate and interstate streams.

The interstate compact as a means of promoting interstate cooperation offers important possibilities covering a wide range of state activities of various types. In generalizing about compacts, it is necessary to note, however, the different situations in which and purposes for which they are proposed or utilized in different sections of the Nation in their bearing on long-term State and national policy. Furthermore, the rights of the United States as well as those of the States must be carefully considered and fully safeguarded, particularly in view of the fact that such compacts once made and ratified by the Congress (or authorized branch of the Executive) are almost impossible to alter.

> "A sound Federal water policy should promote cooperation with the several States, not only in the management of intrastate streams but also in interstate streams. That cooperation should not be interpreted as a one-way proposition. The times call loudly for recognition of reciprocal responsibilities. In recent years many States have appeared to be highly, and properly, sensitive to their rights but correspondingly insensitive to their responsibilities. They apparently fail to see that eventually authority over streams necessarily goes hand in hand with responsibility for them. Every State has responsibilities, no less than rights, and these responsibilities cannot properly be shifted to the Federal Government."—Water Resources Committee.

5. It will hold facts to be indispensable prerequisites to sound action.

> "Conclusions and commitments looking to the solution of water problems should be based on facts, not on mere opinions. Prompt preparation for efficient action, rather than prompt action though unprepared, is the essence of right

procedure. No crisis, whether of flood or drought or work relief, should lead to neglect of these precepts. The adoption of a plan for the regulation and development of any large river without a definitive study of adequate data on all phases of the physical and human problems involved is illogical, is almost certainly wasteful, is a signal for controversy, and may preclude suitable action later. Such studies take time, of course, but 'time pays little respect to that which is done without it.' Impatient planners and impatient citizens would alike do well to heed this proverb. When the prospective beneficiaries of costly measures of water control or use demand in their impatience that the processes of thorough-going investigation be abandoned, they do themselves and the public at large a disservice."—Water Resources Committee.

6. It will assign the cost of constructing and operating projects among the agencies concerned in general accordance with the distribution of benefits.

"The principle of normally sharing costs according to benefits might be less unpopular in many quarters if the elementary fact were kept firmly in mind that no Federal source of funds exists into which States and local communities can dip without cost to themselves. Any so-called gift from the Federal Government must eventually be paid back by the people of the country in the form of taxes. Moreover, sharing costs has a salutory effect in curbing lavish expenditures. The principle should be maintained and extended in the field of water resources."—Water Resources Committee.

7. In determining whether or not projects are justifiable, and in distributing the costs of projects among the beneficiaries, it will take account of social benefits as well as economic benefits, general benefits as well as special benefits, potential benefits as well as existing benefits, where they are involved.

> "The relation of costs and benefits is patently a crucial matter in deciding whether or not large water projects should be undertaken and in timing meritorious projects. The widespread practice of ignoring general benefits and potential benefits in evaluating certain types of projects is no longer defensible. Social accounting should take its place with economic accounting. The procedure followed by public agencies in these matters should be standardized and modernized."—Water Resources Committee.

In addition to the foregoing considerations, policies for drainage basin development must be related from an over-all national viewpoint and to the business cycle. Ability to pay must be reckoned as well as benefits. The Federal interest necessarily varies in different places, with different types of projects, and in changing times. The National Resources Committee has previously emphasized and now reiterates the important consideration that both the amount and type of construction and the division of costs among Federal, State, and local agencies should vary with the movements of the business cycle.

Functional Problems

The policies relating to major drainage basin problems are:

Flood Control

The Drainage Basin Report recommends a program of investigations and construction for flood control and flood protection continuing many projects already authorized or under way. The interlocking problems presented by the Ohio and Mississippi Rivers, however, are so complex in character, so broad in scope, so inadequately explored as yet, and so far reaching in their relationships to various unsolved problems of national policy that it would be most unwise for the Congress to authorize at this time any additional general flood-control plan for them. The early inauguration of the proposed com-

prehensive studies outlined in the Drainage Basin Report is urged.

Problems of flood-control policy also involve the need for early decision on allocation of costs in fair proportion to the incidence of benefits and ability to pay. Federal contributions should normally be determined by and limited to the extent of the national interest in the control or protection to be provided. As a condition of Federal assistance to local areas, a comprehensive flood-control code should be prepared and passed by the States affected. Such a code should include provision for appropriate Federal, State, and local action looking toward the zoning of flood plains and interstate cooperation in the planning and operation of projects. Long-range planning for programs of land management throughout the watersheds where flood-control projects are proposed must await completion of surveys now being carried on by the Department of Agriculture.

Irrigation

The report recommends a series of suggested changes and reinforcement of reclamation policies. A special study of the basis of repayment is now in progress. The reclamation projects already authorized and started are estimated to cost over a period of years upwards of $600,000,000 to complete. A general and comprehensive survey of the water resources and needs of the entire arid and semiarid regions is needed to provide an effective basis for future planning and development.

The program in the Drainage Basin Report deals primarily with projects supplying supplemental water and with completion of projects already partly developed.

Water Power

Latent power resources of American rivers should be developed as rapidly as feasible; multiple-purpose projects should be considered as joint developments

for the several purposes involved; and programs for the coordination of existing and future power facilities should be based on investigations of the production, transmission, and marketing of power. Such investigations obviously should precede the formulation of any program for the installation of power facilities at multiple-purpose projects. A number of projects involving power installations are included in the recommended program under other headings according to the construction agency involved.

Navigation

Large sums have been and are being expended for development of navigation facilities and inland waterways. The Water Resources Committee recommends re-appraisal of the policy covering such projects, and particularly that new projects should be appraised from the standpoint of their suitability as components of a general land-water transportation system.

A 6-year program of navigation projects is included in the recommendations involving upwards of $200,000,000.

Soil Conservation

Soil conservation and land management measures to retard run-off and thereby reduce soil erosion and sedimentation, to lessen flood damage and to alleviate effects of drought by subsoil storage should be prosecuted vigorously.

Beach Erosion Control

In the case of beach-erosion control, problems of the relation and the extent of Federal, State, and local participation require further clarification.

Small Projects for Agriculture and Grazing

A program for small-scale water improvements on farm and grazing lands of the arid and semiarid regions should be carried forward promptly.

Public Water Supply

Adequate supplies of good water for domestic, municipal, and industrial use and suitable facilities for the disposal of wastes are dominant water issues in many densely settled and highly industrialized river basins. The responsibility for providing water supply works and sewerage works has rested chiefly on municipalities or other local public bodies, under State supervision. This is proper, as the benefits from such works are largely local. Nevertheless, the Federal Government should vigorously stimulate investigations, particularly on a cooperative basis, of sources of public water supply.

Pollution

In previous reports the National Resources Committee has endorsed proposals for continuation of Federal financial assistance for pollution abatement work. Loans and grants for this purpose should, of course, be approved by an overlying public works agency, so as to provide coordination with public works policy and general plans for drainage-basin development.

Recreation and Wildlife

Water areas created in the interest of other projects for flood-control, irrigation, navigation, etc., should be made to serve recreational and wildlife purposes insofar as is reasonably compatible with the primary purpose.

Hydrologic Data and Investigations

The collection of essential data on the amount, variation, and quality of water resources should be improved by the establishment of a network of base observation stations, by additional assistance to the cooperative state—Federal observation stations, and by expansion of basic hydrologic research.

Drainage Basin Committee, with State and Federal repres

epresentatives, prepared recommendations for these basins.

Multiple-Purpose Projects

The National Resources Committee wishes to emphasize the need for continuing the comprehensive, basin-wide studies to provide an adequate basis for multiple-purpose projects, the clarification of cost allocation methods and the integrated development of as many as possible of the water resources in every drainage basin.

Regional Problems

A realization of the interlocking relationships existing between the several types of water problems and between water and land problems is indispensable to their wise solution. More and more clearly, integrated regional patterns of control and development for water and land resources are being visualized. More and more clearly it is seen that only by comprehensive attacks on the interdependent problems of unit areas, in most instances drainage basins, can costly mistakes, far too common through many years, be avoided. The time has come when both wasteful use of water and unplanned use of public funds in dealing with water should cease. No longer should a project be planned to serve a single purpose if it can advantageously be made to serve several purposes. No longer should a project be undertaken in one locality without regard to its effect on other localities or to the needs of other localities. A unified regional treatment of water and land problems is essential to the public welfare.

A section of the Drainage Basin Report outlines the principal problems of water control and use in the 17 districts into which the various drainage basins of the country are grouped for convenience. In most districts, no major changes occurred during the year. Much work was started; much information was gathered; many plans and projects were refined, enlarged, or diminished, in the light of better data; emerging needs were recognized in revised plans; and numerous problems were delimited more clearly. In short, the elements of a national water plan have

been visualized more definitely through cooperative effort, especially in terms of regional and inter-regional relations. The following paragraphs indicate outstanding problems in the several districts:

New England

Chief among the water problems of New England are flood control and pollution abatement. Flood control should be approached primarily as one of several benefits that may result from the construction of reservoirs to collect flood waters and release them later in relatively dry periods. Power, sanitation, and recreational opportunities all are involved. Pollution abatement, at least to a degree that would eliminate threats to public health, minimize nuisances, and render the river water suitable for the less exacting industrial uses, is a matter of prime importance along various rivers. The regional plan recognizes opportunities for safeguarding the developing water facilities already used by millions of people each year for recreational purposes.

North Atlantic

Additional water supplies for various cities, including New York and Philadelphia, are outstanding needs in the North Atlantic district. Excessive pollution of surface waters and depletion of groundwater supplies in the metropolitan areas are matters of hardly less concern. Both problems have troublesome interstate relationships. Here, as in New England, further development of water power apparently can be made practicable in combination with several other objectives. Coastal erosion calls for preventive measures locally, and the growing requirements of ocean shipping at the great ports make waterway and harbor improvements recurrent needs.

Middle Atlantic

Soil-erosion abatement in the Piedmont Plateau, malaria control in the Coastal Plain, and water sup-

plies and sewerage facilities for many communities are widespread problems in the Middle Atlantic district. Further studies are needed with respect to large undeveloped water power resources in the highlands, opportunities for directing the development of recreational resources along rational lines, and practicable means for safeguarding wildlife resources.

Southeast

The Southeast district needs protection of public health in malaria-infested areas, improvement of many inadequate and unpalatable water supplies, and abatement of pollution in various streams and bays. Better land management is urgent in seriously eroded areas of the Piedmont. There are flood-control problems in several basins. Beach-erosion control and better facilities for coastal navigation are desirable in parts of the long coast line. River regulation in the uplands has important possibilities for multiple use, including power. There are large opportunities for promotion of recreation and wild life conservation. Much developmental work that is needed cannot be undertaken with confidence until comprehensive studies of underlying problems have been made.

Tennessee Valley

The completion of the system of dams now under construction or proposed by the Tennessee Valley Authority will provide regulation of the Tennessee river for navigation, flood control and incidental development of power. An all-inclusive plan for the main river and its tributaries is still under investigation. The objective of this plan is the ultimate unified development of the entire system. The method of attaining that end remains an experiment in governmental planning and administration.

Ohio Basin

The Ohio River remains "a sewer, a source of water supply, an outlet for floods, and a highway." The varied and repeated uses of its waters reflect great opportunities, but they also present serious dangers. The flood of 1936 in the upper valley and the flood of 1937 in the middle and lower valley focused attention on the twin problems of flood control and flood protection. Less spectacular, but perhaps of even greater similar social import, are the related problems of low water flow, water supply, and waste disposal. A determined attack on these problems and various corollary problems by means of river regulation and unified development is imperative.

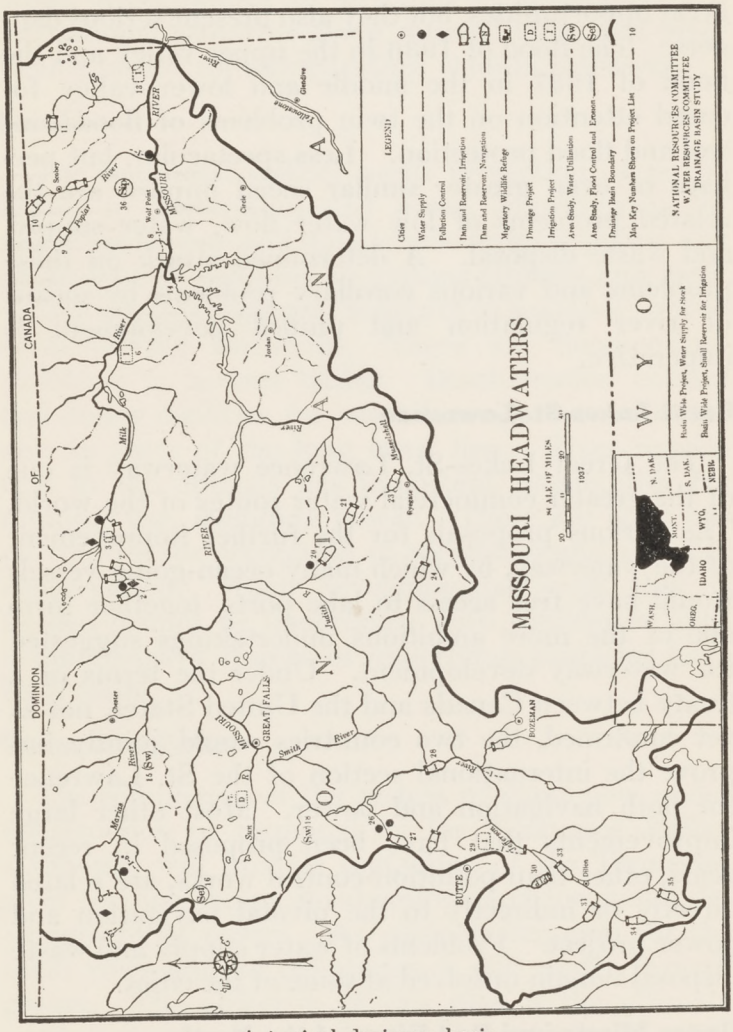
Great Lakes-St. Lawrence

The Great Lakes-St. Lawrence waterway is one of the greater commercial water routes of the world. The various proposals for the further improvement of the waterway, by which many ocean-going vessels would have free access to lake ports, together form one of the more ambitious undertakings suggested for waterway development. Under the terms of a treaty between Canada and the United States, not as yet confirmed, the two countries would jointly improve the international section of the St. Lawrence for both navigation and power. Most other large improvements that have been proposed in recent years, other than pollution-control works, are related directly or indirectly to the pivotal navigation and power project. Problems of water supply and waste disposal remain unsolved at some of the cities.

Upper Mississippi-Red River of the North

The problems of water in the drainage area of the Upper Mississippi include almost every phase of water regulation and use. Navigation, flood control, water power, drainage, pollution abatement, surface

and underground water supplies, recreation, wildlife conservation, soil erosion, and siltation in stream channels and reservoirs, all are involved, and most of them are of some importance in each sub-basin.



A typical drainage basin.

It is the multiplicity of interlocking problems, not the outstanding importance of a few problems, that characterizes this section of the district.

A somewhat similar situation exists in the section of the district comprising the basin of the Red River

of the North, where such diverse but interrelated matters as abatement of stream pollution, control of low waterflow, improvement of municipal and rural water supplies, protection against distress from droughts and floods, enhancement of recreational values in natural lakes, wildlife conservation, and promotion of the utility of water for power development, are of interest to three States. Progress to date with these problems affords an excellent example of what may be accomplished when the energies of many individuals and of local, State, and Federal agencies are directed cooperatively toward a common objective.[8]

Missouri Basin

The principal water problems of the Missouri Basin reflect the several types of climate within its great area. It is arid in its western third, semiarid to subhumid in its middle third, and humid in its eastern third. Provision of supplemental water for irrigation is uppermost among the water problems of the western third. Adjustment of land-use practices to a scant and unreliable water supply, controlled and developed as effectively as possible, is paramount in the middle third. Control of floods and abatement of pollution in several sub-basins are primary matters in the eastern third.

Southwest Mississippi Basins

The major streams of the Southwest Mississippi District are "through rivers," with dissimilar characteristics and therefore distinctive problems in their upper, middle, and lower sections. An outstanding need of the upper basins is more water for large areas now partly irrigated; of the middle basins, feasible measures for saving variable supplies of water not now put to beneficial use; of the lower basins, multiple-purpose control and development.

[8] Regional Planning, Part V, Red River of the North, U. S. Government Printing Office, August 1937.

Lower Mississippi

Occupancy of the fertile alluvial valley of the Lower Mississippi always has been menaced by floods, and adequate flood control and flood protection remain the outstanding problems. The redesign and reconstruction of hundreds of independent drainage works and their integration into a few well planned and unified systems is a related need of prime importance. Endemic malaria is prevalent throughout the area and its control is dependent upon proper drainage and the coordination of other phases of water management. In general, the water problems relate chiefly to protection against surplus waters and to their disposal with safety, rather than to the retention of water for man's use. Nevertheless, problems of the latter type are under consideration in certain areas.

Upper Rio Grande

The two outstanding water problems of the Upper Rio Grande (above Fort Quitman, Tex.) are the settlement of a long-standing controversy among Colorado, New Mexico, and Texas over the waters of the river, and the adoption of measures for conserving and augmenting the supply of water. The solution of the first problem is a prerequisite to solution of the second. Negotiations for an interstate compact are in progress.[9]

Western Gulf

In this district, water problems are of wide variety; individual streams present strikingly different problems in their upper and lower courses. The problems of major concern include flood control; provision of water for irrigation, and for municipal and industrial purposes; investigation and utilization of underground supplies; extension and improvement of

[9] Regional Planning, Part VI, Upper Rio Grande, Scheduled for publication in March 1938.

navigation facilities along and near the coast; and settlement of interstate and international conflicts of interest in water.

Colorado District

A comprehensive plan for the utilization of the Colorado River involves many complex and conflicting interests—intraregional, interregional, interstate, and international in character. At present, the question of where the supplies of water now unused shall be utilized is even more important than the question of how they shall be utilized. The heaviest demand upon the waters of the river system is for irrigation, on which nearly all activities within the basin rely either directly or indirectly. Perhaps the greatest single technical problem of the basin, particularly in its lower part, is the control of sediment.

The Great Basin

The Great Basin is excessively arid, except on the rain-catching slopes of its higher mountains. Lack of water, more than all else, has restricted its settlement and development in the past. Lack of water, more than all else, will limit its potentialities in the future. The opportunities for augmenting the available supply are few and for that very reason they should be developed as fully as practicable. The problem involves measures to reduce losses by seepage, evaporation, and storm run-off, exploration and utilization of underground resources, and importation from contiguous basins if practicable.

The California District

Arid in the south, semiarid in the interior valleys, and humid only in the northwest, the outlook for the California district depends chiefly on the supply of water which can be made regularly available for essential purposes. In comparison with the need of more water for irrigation and for domestic and

industrial use by the urban populations, all other water problems are of minor importance. They include local problems of flood control, abatement of pollution, river and harbor improvement in behalf of navigation, and the development of water bodies for recreational use. Further water planning should be based on the State water plan, of which the multiple-purpose Central Valley project, now underway, is an important part.

Pacific Northwest

The major water problems of the Pacific Northwest are problems of the Columbia River System. Grand Coulee and Bonneville Dams are the uppermost and lowermost of a system of 10 dams proposed for the ultimate unified development of the Columbia. Thorough investigation of various phases of the proposal is essential, and it should by all means precede the construction of any more units of the system. Provision of an adequate water supply for lands now partly irrigated is a pivotal problem in various tributary valleys east of the Cascades. Flood control is a major need of the Puget Sound area. Pollution, mostly from paper mills, is serious on the Willamette River.

PROGRAM

In accordance with the President's request, a program of specific projects covering a 2- to 6-year period has been prepared by the Water Resources Committee.

The criteria by which meritorious construction projects were selected for inclusion in the recommended program were set forth as follows in a memorandum of instructions to the 45 cooperating Basin Committees:

1. They must be economically feasible; the anticipated benefits must outweigh the estimated costs.

2. They must be feasible from an engineering standpoint; competent surveys must have indicated

that all structures involved would be safe, that they would yield the anticipated benefits, and that more detailed surveys, if needed or undertaken, probably would not result in important alterations in the scope or cost of the work.

3. They must be consistent with the Recommended Plan for the drainage basin as redefined at present.

4. Their successful initiation or completion must not depend upon the solution of technical or legal problems which might require for solution more than 5 years, or upon the construction of other projects, or upon changes in economic conditions which probably would not occur in less than 6 years.

5. They must be of relatively high social value, and of immediate rather than prospective urgency.

PROGRAM

Summary of cost of recommended 6-year program for conservation of water resources

[Primarily Federal—with non-Federal contributions [1]]

Class of work	Investigation [2]	Construction	Total
Flood control: Ohio and lower Mississippi_2 years__	$15, 850, 000	$65, 416, 000	$81, 266, 000
T. V. A. program____do____	1, 722, 000	73, 339, 000	75, 061, 000
General flood control 6 years__	7, 000, 000	[3] 177, 629, 000	184, 629, 000
Irrigation_____do____	3, 587, 000	[4] 287, 952, 000	291, 530, 000
Water power_____do____	3, 650, 000	([5])	[5] 3, 650, 000
Rivers and harbors___do____	1, 750, 000	178, 825, 000	180, 575, 000
Rural water supply___do____	----------	33, 825, 000	33, 495, 000
Beach erosion control__do____	617, 000	13, 782, 000	14, 399, 000
Recreational waters___do____	139, 000	5, 019, 000	14, 258, 000
Wildlife conservation__do____	270, 000	8, 253, 000	8, 523, 000
Hydrologic data_____do____	12, 796, 000	----------	12, 796, 000
Total_____	47, 381, 000	843, 710, 000	891, 091, 000
Weighted average per year___	13, 754, 000	186, 870, 000	200, 624, 000

[1] Non-Federal projects, such as water supply and pollution abatement, are not included in this list, but a recommended program involving upwards of $560,000,000 for water supply and $660,000,000 for pollution abatement is shown on p. 129 of the Drainage Basin report.

Land management programs effecting water have been omitted because of the necessity of confining the program to problems that are essentially water problems rather than land problems.

[2] The recommended investigations include many items which should be continued annually after the completion of the above 6-year program.

[3] Cost of lands and damages, $27,043,000, to be contributed by local interests, is additional.

[4] 6-year program only: Balance to complete, after 6-year program, $354,142,000.

[5] Construction of water power projects is included in other items according to the construction agency or other purposes served by the multiple-purpose structure involved.

This list has been carefully prepared by competent engineers and specialists on the Water Resources Committee. The National Resources Committee endorses the program in principle as indicating a substantial advance in the theory and practice of Public Works Planning.

Water projects constitute almost 40 percent of the general public works program included in the President's Budget recommendation for 1939. Procedures followed by the Water Resources Committee in formulating a program of drainage basin projects are applicable to other parts of the capital improvement budget. In submitting this program, the National Resources Committee renewed its previous recommendation for the establishment of a "National Balance Sheet" which will distinguish between expenditures for public works and ordinary expenditures for operation and maintenance.

The development of a program covering a term of years provides a reservoir of projects available for use on either a contracted or expanded scale in any 1 year. It exemplifies again the principle often urged by the Committee that public works, if planned in advance, can be a factor in the mitigation of business booms and depressions.

The availability of such lists and programs depends on the continuation of the organization and studies covered in this report. A National Planning agency should have as one of its chief duties the continuous development of broad plans for full use of our water resources in relation to human needs and social objectives.

WATER PLANNING

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Development of the Rivers of the United States (H. Doc. 395, 73d Cong., 2d Sess.) a message from the President of the United States transmitting a preliminary report on a comprehensive plan for the improvement and development of the rivers of the United States with a view of giving the Congress information for the guidance of legislation which will provide for the maximum amount of flood control, navigation, irrigation, and development of hydroelectric power.

Printed, 6 by 9 inches, paper cover, 123 pages, 57 maps. Available only at the office of the Superintendent of Documents, 80 cents.

(Published by Congress.)

Report of the Mississippi Valley Committee, dated October 1, 1934, and issued December 23, 1934, a plan for the use and control of water within the Mississippi drainage basin.

Printed, 234 pages, 8¾ by 11¼ inches, cloth covered, 15 colored illustrations, 54 illustrations, and nine folded maps. Available only at the office of the Superintendent of Documents, $1.50.

(Published by the Mississippi Valley Committee.)

Report of the Water Planning Committee, forming Part III of Report of the National Resources Board Report, December 1934. (See item under "General," p. 34.)

Inventory of the Water Resources of the United States, June 1935. Multilithed, paper covered, about 9 by 11¼ inches. A report covering basic data, present development, and potential development of the water resources of the United States. The report is divided into eight sections according to drainage areas, and the parts published separately. Available in limited numbers, National Resources Committee.

Drainage Basin Problems and Programs, published December 1, 1936, represents the first attempt through joint efforts of Federal, State, and local agencies, official and nonofficial, to formulate a national water plan. The chief water problems in 118 drainage basins are discussed and detailed project lists are proposed.

Printed, 539 pages, paper cover, quarto, illustrated. Superintendent of Documents, $1.50.

Drainage Basin Problems and Programs—1937. Published February 1938, and is a revision and extension of the initial report published in December 1936. Contains specific project lists and recommendations on national water policies.

Printed, 154 pages, illustrated. Superintendent of Documents.

Deficiencies in Basic Hydrologic Data, published in September 1936. A report of the Water Resources Committee which proposes remedies for current deficiencies in hydrologic data essential for sound water conservation. Includes recommendations for standardization of procedures and measures.

Printed, 66 pages, paper cover, 25 illustrations. Superintendent of Documents, 30 cents.

Report on Water Pollution by the Special Advisory Committee of the Water Resources Committee, appointed in December 1934 to study the conditions of a comprehensive plan of attack on the problem of pollution. Published in September 1935.

Mimeographed, 82 pages, 8 by 10½ inches, paper cover, one illustration. Available in limited numbers, National Resources Committee.

Second Report on Water Pollution, by the Special Advisory Committee. Published as a part of the record of hearings on H. R. 2711, H. R. 2300, and H. R. 3419. Published in May 1937.

Printed, 54 pages, paper, octavo. A limited supply of this publication is available. Copies may be had by writing to the National Resources Committee.

Reference List of Other Publications of the National Resources Committee

GENERAL

National Planning Board Report 1933–34, dated August 1, 1934, and issued November 16, 1934. "A Plan for Planning." Final report of the National Planning Board, which was succeeded by the National Resources Board by Executive order of the President on July 30, 1934.

Printed, 123 pages, paper cover, 5 illustrations, Superintendent of Documents, 25 cents.

National Resources Board Report, published December 1, 1934, issued December 18, 1934, and submitted to the

President in accordance with Executive Order No. 6777, June 30, 1934. A report on national planning and public works in relation to natural resources and including land use, and water and mineral resources with findings and recommendations.

Printed, paper covered, approximately 9 by 11½ inches. Divided into five parts, obtainable separately, or together (bound in cloth, $3.25), at the office of the Superintendent of Documents.

Prices for the separate paper covered parts are: Part I, report of the Board, 25 cents; Part II, Land Report, 35 cents; Part III, Water Resources, $1; Part IV, Mineral Policy, 15 cents; and Part V, Report of the Board of Surveys and Maps, 20 cents.

Progress Report With Statements of Coordinating Committees, published June 15, 1936. A summary of the organization and work of the National Resources Committee and its coordinating committees during the last year and suggests further activity for the future.

Printed, 61 pages, paper cover, 10 maps. Superintendent of Documents, 25 cents.

Technological Trends and National Policy, published in June 1937, is the first major attempt to show the kinds of new inventions which may affect living and working conditions in America in the next 10 to 25 years. It indicates some of the problems which the adoption and use of these inventions will inevitably bring in their train. It emphasizes the importance of national efforts to bring about prompt adjustment to these changing situations, with the least possible social suffering and loss, and sketches some of the lines of national policy directed to this end.

Printed, 388 pages, paper cover, quarto, 73 illustrations. Superintendent of Documents, $1.

Our Cities—Their Role in the National Economy, published June 1937 and transmitted to President Roosevelt. This report was submitted to the National Resources Committee by its Urbanism Committee. The report consists of a Foreword by the National Resources Committee and three parts. Part 1 is composed of three sections under the following headings: The Facts About Urban America; The Process of Urbanization; The Problems of Rural America. Part 2 discusses The Special Studies of the Urbanism Committee. Part 3 contains statements of General Policy and Recommendations.

Printed, 87 pages, quarto, illustrated, Superintendent of Documents, 50 cents.

Progress Report—1937, published October 1937. A summary of the organization and work of the National Resources Committee and its coordinating committees during the period June 1936 to October 1937, together with a description of current activities and a list of publications issued to date.

Printed, 20 pages, paper cover, illustrations. Superintendent of Documents, 10 cents.

STATE PLANNING

State Planning—A Review of Activities and Progress, published in June 1935, shows the growth of State planning and the value and importance of State responsibility for planning endeavor.

Printed, 9¼ by 11½ inches, paper cover, 6 colored illustrations, 119 illustrations. Superintendent of Documents, 75 cents.

State Planning, Programs and Accomplishments, Published December 1, 1936, and transmitted to President Roosevelt on January 26, 1937. A report containing authorized statements of State and regional planning boards concerning their activities during recent months. It supplements the State Planning Report of 1935.

Printed, 128 pages, paper cover, quarto, frontispiece. Superintendent of Documents, 25 cents.

REGIONAL PLANNING

Regional Factors in National Planning and Development, published in December 1935, deals with important problems of planning and development which overlap State lines or which involve Federal and State or local interests and jurisdictions.

Printed, 9¼ by 11½ inches, paper cover, 160 illustrations. Superintendent of Documents, 50 cents.

Regional Planning, Part I—Pacific Northwest, published in May 1936. This, the first of a series of reports on regional planning, deals with immediate and urgent problems in the Columbia Basin and particularly with the policies and organization which should be provided for planning, construction, and operation of certain public works in that area, Bonneville and Grand Coulee dams in particular.

Printed, 9 by 11½ inches, paper cover, 56 illustrations, numerous charts, 192 pages. Superintendent of Documents, 50 cents.

Regional Planning, Part II—St. Louis Region, published in June 1936. The National Resources Committee has secured the cooperation of the St. Louis Regional Planning Commission in the preparation of this document, Part II of the series on regional planning, and has added a brief foreword with findings and recommendations.

Printed 9 by 11½ inches, paper cover, 68 pages, 30 illustrations. Superintendent of Documents, 25 cents.

Regional Planning, Part III—New England, published in July 1936. This report, prepared by the New England Regional Planning Commission, illustrates the possibilities of cooperation among state planning agencies for joint attack on interstate problems. The National Resources Committee has added its findings and recommendations.

Printed, 101 pages, 102 illustrations, paper cover. Superintendent of Documents, 30 cents.

Regional Planning, Part IV—Baltimore-Washington-Annapolis Area, published by the Maryland State Planning Commission in November 1937. The report, prepared by a consulting staff provided by the National Resources Committee, is an analysis of the problems of the area and their relative importance. Final recommendations indicate measures necessary to bring about needed improvements in the area, which embraces 2,500 square miles.

Printed, 65 pages, quarto, Maryland State Planning Commission, 40 cents.

Regional Planning, Part V—Red River of the North, published August 1937 and transmitted to President Roosevelt. The report was prepared by the Interstate Committee on the Red River of the North with the assistance of consultants from the National Resources Committee. It represents the first attempt by the States of North Dakota, South Dakota, and Minnesota to treat jointly problems of conservation and transportation of water, pollution and flood control of the Red River of the North Drainage Basin.

Printed, 80 pages, quarto, Superintendent of Documents, 25 cents.

Regional Planning, Part VI—Upper Rio Grande. This is the report on the Rio Grande Joint Investigation in the Upper Rio Grande Basin in Colorado, New Mexico, and Texas, 1936–1937. This report, scheduled for publication in March 1938 furnishes a sound factual basis for an apportionment of the waters of the Rio Grande above Fort Quitman that would be fair to each of the States concerned. In two volumes, Vol. II is box of maps. Price, $3.50.

Printed, 566 pages, quarto, Superintendent of Documents.

Regional Planning, Part VII—Alaska, Its Resources and Development, prepared by the Alaska Resources Committee in accordance with a Congressional resolution and submitted to President Roosevelt in December 1937. It is a study of the development of Alaska resources up to the present and contains recommendations for the future.

Transmitted to Congress and ordered printed as House Document 485.

PUBLIC WORKS

Public Works Planning, published December 1, 1936, and transmitted to Congress by President Roosevelt on February 3, 1937. A report recommending a proposed policy for planning, programming, timing, and division of costs of public works, including a report on Drainage Basin Problems and Programs. The report was prepared by the Projects Division of the Federal Emergency Administration of Public Works, a special research staff on division of costs of public works and the Water Resources Committee of the National Resources Committee.

Printed, 221 pages, paper cover, quarto, illustrated. Superintendent of Documents, 60 cents.

Criteria and Planning for Public Works, a research by Russell V. Black, Research Consultant, June 1934. Prepared at the request of the former National Planning Board as one of a series of researches on different aspects of public works. It is a report upon a research in national physical planning, the magnitude of future public works and criteria applicable to their selection and programming, with tentative conclusions.

Mimeographed, 182 pages, 8 by 10½ inches, paper cover, no illustrations. Available in limited numbers, National Resources Committee.

Economics of Planning Public Works, by John Maurice Clark, Professor of Economics, Columbia University. Presents a part of the research work carried on by a staff serving under the National Planning Board to answer the question: How may Public Works be so handled as to contribute as much as they can to industrial stability?

Printed, 194 pages, 6 by 9 inches, paper cover, six charts. Superintendent of Documents, 25 cents.

Public Works in Prosperity and Depression, and their utilization as an agency of economic stabilization, by Arthur D. Gayer, September 23, 1935. This volume is a revised version of the official report made to the National Planning Board by Dr. Gayer in June 1934.

Printed in book form, 9¼ by 6½ inches, cloth binding, 484 pages, 100 tables, 3 charts. Obtainable only at the National Bureau of Economic Research, 1819 Broadway, New York City. Price, $3.

(Published by the National Bureau of Economic Research.)

LAND PLANNING

Supplementary Reports of the Land Planning Committee incorporating the basic data and information collected in preparing Part II of the National Resources Board report of December 1934. The 11 reports are printed separately, illustrated, 9 by 11½ inches, paper covers, and are or will soon be available at the office of the Superintendent of Documents.

Part I, General Conditions and Tendencies Influencing the Nation's Land Requirements, 47 pages, 20 cents.

Part II, Agricultural Exports in Relation to Land Policy, 114 pages, 30 cents.

Part III, Agricultural Land Requirements and Resources, 64 pages, 60 cents.

Part IV, Land Available for Agriculture Through Reclamation, 51 pages, 35 cents.

Part V, Soil Erosion, A Critical Problem in American Agriculture, 112 pages, 75 cents.

Part VI, Maladjustments in Land Use in the United States, 55 pages, 25 cents.

Part VII, Certain Aspects of Land Problems and Government Land Policies, 139 pages, 40 cents.

Part VIII, Forest Land Resources, Requirements, Problems, and Policy, 114 pages, 50 cents.

Part IX, Planning for Wildlife in the United States, 24 pages, 10 cents.

Part X, Indian Land Tenure, Economic Status, and Population Trends, 73 pages, 20 cents, are available at the office of the Superintendent of Documents.

Part XI, Recreational Use of Land in the United States, is being printed and will be available at the office of the Superintendent of Documents.

Farm Tenancy, a report of the President's Committee on this subject, prepared under the auspices of the National Re-

sources Committee. The report presents findings of the Committee, recommendations for action, and official documents. It contains a technical supplement tracing the distribution and growth of tenancy and analyzing conditions and problems confronting farm tenant families in the United States.

Printed, 108 pages, paper cover illustrated. Published February 1937. Available from the Superintendent of Documents, 30 cents.

(Published by the President's Committee.)

Future of the Great Plains, a report of the Great Plains Drought Committee, with a study of characteristics of the area, a proposed program of readjustment and development, together with supplements and appendices covering "Institutional Readjustment," "Education For Conservation," a report of pertinent existing legislation and a bibliography for the nonprofessional reader. December 1936.

Printed, 194 pages, paper cover, illustrated. Available at the Superintendent of Documents, 40 cents.

(Published by the Great Plains Committee.)

U. S. GOVERNMENT PRINTING OFFICE: 1938

For sale by the Superintendent of Documents, Washington, D. C. Price 10 cents

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